

MEMORIAL UNIVERSITY OF NEWFOUNDLAND

DEPARTMENT OF MATHEMATICS AND STATISTICS

IMPROPER INTEGRALS

Math 1001 Worksheet

FALL 2019

For practice only. Not to be submitted.

1. Determine whether each of the following improper integrals converges or diverges, finding the value of those integrals that converge.

(a) $\int_2^{\infty} \frac{1}{\sqrt{4x+1}} dx$

(b) $\int_0^4 \frac{1}{\sqrt{4-x}} dx$

(c) $\int_{-\infty}^0 e^{3x} dx$

(d) $\int_1^{\infty} \frac{1}{(x+3)^{\frac{3}{2}}} dx$

(e) $\int_0^{\infty} \frac{x}{x^4+1} dx$

(f) $\int_{-\infty}^0 \frac{e^x}{1+e^x} dx$

(g) $\int_0^3 \frac{1}{\sqrt{9-x^2}} dx$

(h) $\int_0^3 \frac{x}{\sqrt{9-x^2}} dx$

(i) $\int_e^{\infty} \frac{1}{x \ln^2(x)} dx$

(j) $\int_{-\infty}^{\frac{3}{2}} \frac{1}{4x^2+9} dx$

(k) $\int_0^{\infty} x e^{-x} dx$

(l) $\int_1^{\infty} \frac{\ln(x)}{x\sqrt{x}} dx$